

# Math

## for Morons Like Us

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## Area and Volume of Solids

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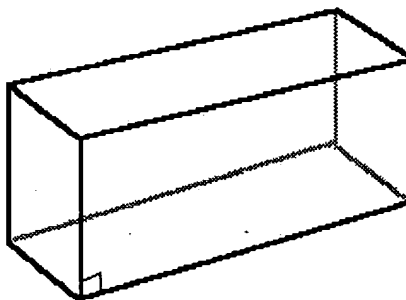
On this page we hope to clear up any problems that you might have with finding the area or volume of solids. Throughout our schooling we have had to know many different formulas dealing with finding the volume of solids. We found that it was helpful to have a reference that had each of the formulas listed so we could easily reference it when we needed a formula or forgot it. That is how this page is laid out, with one special addition - figures that accompany each formula to help make the formula make more sense. Scroll down or click any of the links below to start understanding how to find the volume or area of solids!

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## Area of Prisms

There are special formulas that deal with prisms, but they only deal with right prisms. *Right prisms* are prisms that have two special characteristics - all lateral edges are perpendicular to the bases, and lateral faces are rectangular. The figure below depicts a right prism.



### Right Prism Area

The lateral area  $L$  (area of the vertical sides only) of any right prism is equal to the perimeter of the base times the height of the prism ( $L =$

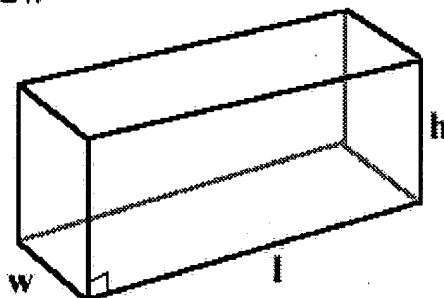
**Site Map****Ph).**

The total area  $T$  of any right prism is equal to two times the area of the base plus the lateral area.

Formula:  $T = 2B + Ph$

$$B = lw$$

$$P = 2l + 2w$$



(The base's formula could change depending on the base's shape.)

(The perimeter's formula could change depending on the base's shape.)

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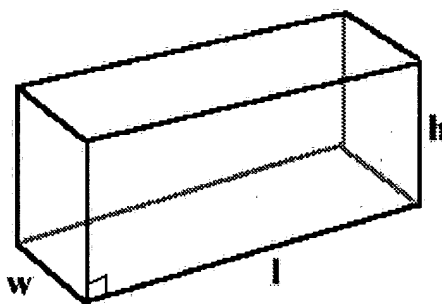
## Volume of Prisms

### Right Prism Volume Postulate

The volume  $V$  of any right prism is the product of  $B$ , the area of the base, and the height  $h$  of the prism.

Formula:  $V = Bh$

$$B = lw$$



(The base's formula could change depending on the base's shape.)

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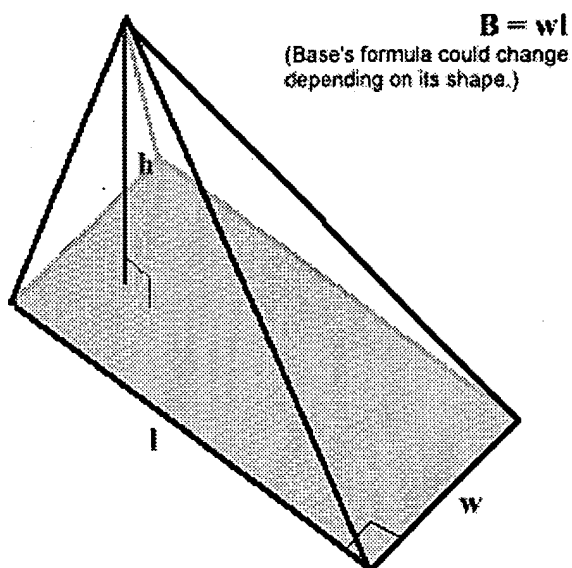
## Pyramids

A *pyramid* is a polyhedron with a single base and lateral faces that are all triangular. All lateral edges of a pyramid meet at a single point, or *vertex*.

**Pyramid Volume Theorem**

The volume  $V$  of any pyramid with height  $h$  and a base with area  $B$  is equal to one-third the product of the height and the area of the base.

Formula:  $V = (1/3)Bh$

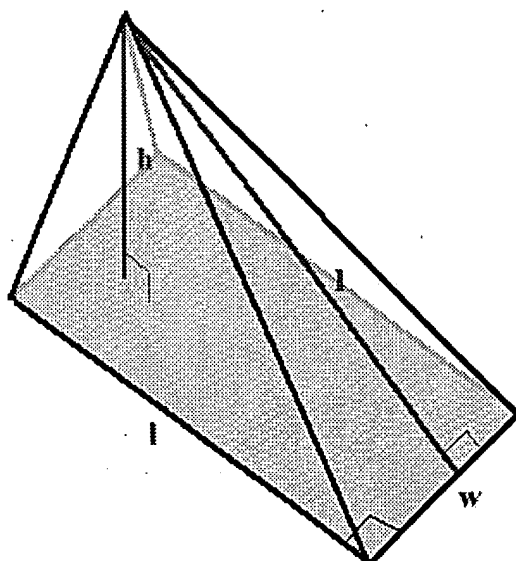


A **regular pyramid** is a pyramid that has a base that is a regular polygon and with lateral faces that are all congruent isosceles triangles.

**Regular Pyramid Area Theorem**

The area  $L$  of any regular pyramid with a base that has perimeter  $P$  and with slant height  $l$  is equal to one-half the product of the perimeter and the slant height.

Formula:  $L = .5Pl$



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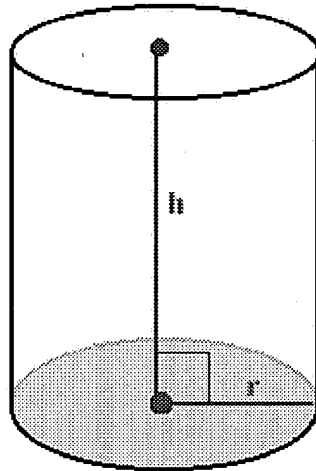
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## Cylinders

### Cylinder Volume Theorem

The volume  $V$  of any cylinder with radius  $r$  and height  $h$  is equal to the product of the area of a base and the height.

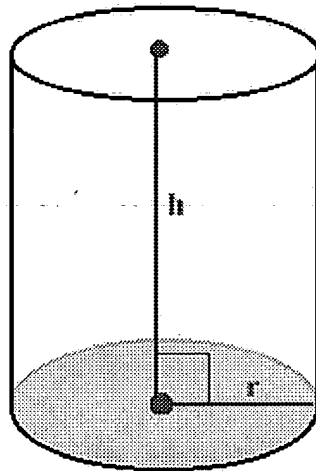
Formula:  $V = (PI)r^2h$



### Cylinder Area Theorem

For any right circular cylinder with radius  $r$  and height  $h$ , the total area  $T$  is two times the area of the base plus the lateral area ( $2(PI)rh$ ).

Formula:  $T = 2(PI)rh + 2(PI)r^2$



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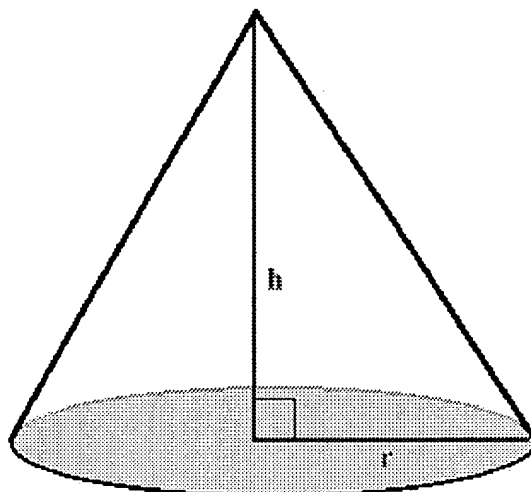
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## **Cones**

### **Cone Volume Theorem**

The volume  $V$  of any cone with radius  $r$  and height  $h$  is equal to one-third the product of the height and the area of the base.

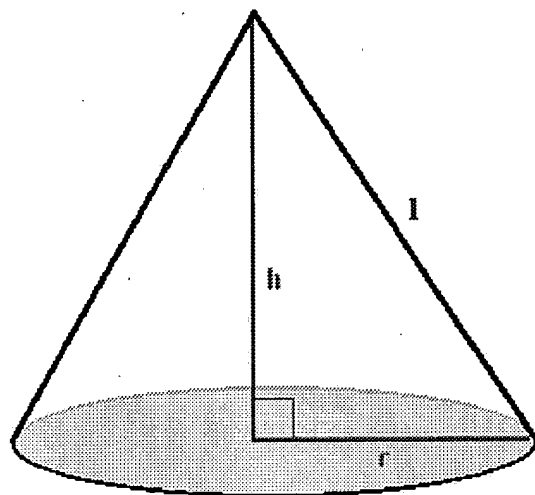
Formula:  $V = (1/3)(PI)r^2h$



### **Cone Area Theorem**

The total area  $T$  of a cone with radius  $r$  and slant height  $l$  is equal to the area of the base plus  $PI$  times the product of the radius and the slant height.

Formula:  $T = (PI)rl + (PI)r^2$



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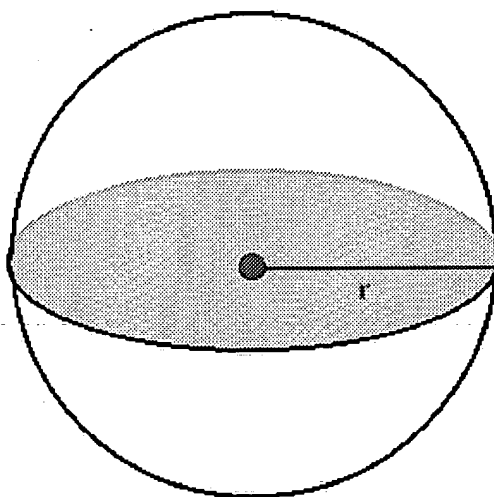
## Spheres

### Sphere Volume and Area Theorem

The volume  $V$  for any sphere with radius  $r$  is equal to four-thirds times the product of  $\pi$  and the cube of the radius. The area  $A$  of any sphere with radius  $r$  is equal to  $4(\pi)$  times the square of the radius.

Volume Formula:  $V = (4/3)(\pi)r^3$

Area Formula:  $A = 4(\pi)r^2$



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**Take the Quiz on area and volume of solids. (Very useful to review for to see if you've really got this topic down.) Do it!**

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**Math for Morons Like Us - Geometry: Area and Volume of Solids  
/20991/geo/solids.html  
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